which I have pictured to you, and in so far will the woman be spared the possible sequelæ.

I have summarized above the cogent reasons which lead me to advocate this measure. The sole objection which may be offered is the fact that it is necessary to insert the hand into the parturient canal after the third stage of labor has been supposedly completed. How far this objection will hold in these days of rigid asepsis I am perfectly willing to leave to your judgment. In mine, the clean hand inserted into the uterus, under conditions when access to its interior is unimpeded, carries no risk to the woman, certainly none comparable to those to which she may be subject if the uterus has not been cleansed of all remnants.

DIABETES MELLITUS.

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During the last few years as cases of diabetes mellitus have come to me, and as I have watched those under treatment, the impression has grown that there was a seasonal variation in their occurrence and severity which is not mentioned either in text-books or monographs. I was therefore prompted to study carefully the statistics of such cases as I have records of. These amounted to fifty-five in all. About one-third of them have been under observation almost continuously for from two and a half to seven years. Most of them have been seen at least once a month, and during exacerbations two or three times a month. A few gaps of from one to six or seven months have occurred in all those longest under observation. The other two-thirds had been watched closely for from six weeks to six months. In preparing the following, Chart 1, the proportion of times that sugar has occurred in the urine to the total number of observations made on these cases in a given month has been compared. For example, in the Januarys of the last seven years sixty unrinalyses have been made on diabetics, and sugar has been found fourteen times. The relation of positive to negative results is therefore 1.4 to 6.6. Chart 1, prepared in this way, shows the correctness of my impression that there is a seasonal variation in the occurrence or recurrence of glycosuria. As will be observed on the chart, glycosuria has occurred three times as often in March and April as in January, four times as often in July, and a little more than three times as often in November. It occurs least frequently in December, January, and February. It is notably less common in May than in April or July. Its frequency of occurrence is seen to diminish during

August, September, and October, culminating in the latter month to rise abruptly in November and to fall as abruptly in December. The same facts can be stated in figures; the proportion of positive to negative observations in each month of the year is as follows:

January	1.4	to	6.6	July	6.1	to	9.0
February	2.8	"	4.2	August	4.6	"	2.4
March	4.6	"	2.4	September	4.4	"	2.6
April	4.6	"	2.4	October	3.7	"	3.3
May	4.0	"	3.0	November	5.0	"	2.0
June	5.2	"	1.8	December	2.5	"	4.5

CHART 1.

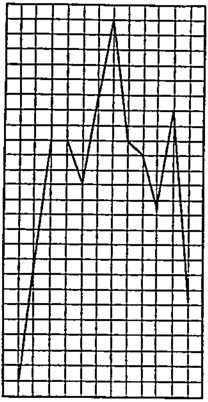


CHART 2.

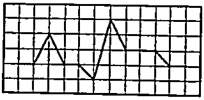


CHART 3.

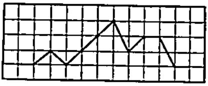


CHART 4.

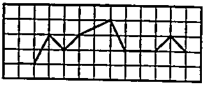


Chart 1. Relative frequency of occurrence by months in chronic diabetes; average from 55 cases.

Chart 2. Relative frequency of occurrence of glycosuria in case of S., under observation for seven years.

Chart 3. Relative frequency of occurrence of glycosuria in case of McK., under observation for four years.

Chart 4. Relative frequency of occurrence of glycosuria in case of J., under observation more than three years.

It is interesting to compare with Chart 1, which is a composite of the averages of fifty five cases, charts made in the same way of a few individual cases. Charts 2, 3, and 4 illustrate the marked similarity in seasonal variations between the three cases that I have had longest under treatment and the general average of cases as shown in Chart 1. The case which Chart 2 represents has been under observation for seven years and has been seen during that time at least once a month, except on two occasions when he was absent from home for from two to three months. Chart 2 represents a case that was under observation four years. There were six months in the middle of this period when he was not seen by me. The third case, represented by Chart 3, has been watched for three years, and during that time he has been seen at least once a month, except for two and one-half months in the third year. It will be observed that these charts correspond almost precisely with Chart 1; the increase in frequency of occurrence of sugar in the urine occurs in March or April, again most notably in July, and again, though to a less extent, in October or November. The periods of its least frequent occurrence are December, January, and May. It is interesting to note that the time of beginning of diabetes in those cases in which I could trace with probable accuracy its commencement corresponds to the periods of frequent occurrence as shown in Chart 5. It began in one-half the cases in July, in about one-fifth in April or November. The coinciding results of these statistics of individual chronic cases and of the average of fifty-five cases, and of the time of beginning of the disease in the twenty-four cases in which it could be accurately traced, are quite convincing of a seasonal variation in the severity of diabetes, at least in this locality. No hypothetical explanation of these facts that I have been able to devise is satisfactory to myself. During the last year and a half I have warned patients of the greater danger of exacerbation of their disease in March, April, July, and November, and of the need of greater dietary care at these times. The study of these fifty-five cases suggested that possibly similar results might be obtained from a study of the mortality tables of Chicago. The printed mortality reports afford the needed statistics from 1864 to 1893 inclusive. It may be interesting to note that the first recorded death from diabetes in Chicago was in January, 1864, and it was the only one that occurred in that year. Chart 5 shows the relative mortality by months during the twenty-nine years from 1864 to 1893. The same facts can be stated in figures. (Column 1, Table I.)

TABLE I.

Months.	Total mortality by months from 1864-93.	Mean temperature.	Mean barometric pressure.
January	51	24.0° F.	29.31
February	38	26.0	29.30
March	51	33.8	29.25
April	30	45.2	29.21
May	47	54.9	29.21
June	34	65.3	29.20
July	44	71.5	29.23
August	38	69.5	29.24
September	44	62.1	29.28
October	47	50.7	29.28
November	38	37.2	29.28
December	43	27.2	29.29

It will be observed at once that there is no similarity between Charts 1 and 5. In other words, that the study of recurring glycosuria in fifty-five cases does not correspond in its seasonal variations with the variations in mortality from the same disease. The mortality is higher about every other month, but averages a little higher during the winter months than at other times, though this is the season when I observed glycosuria recurring least frequently in chronic cases. During these twenty-nine years 132 deaths occurred from diabetes in Chicago during the winter months, 128 during the spring months, 116 during the summer months, and 129 during the fall months. The least number of deaths from diabetes is seen to be in the summer months, when glycosuria seems to recur the oftenest. This fact in regard to the mortality of the disease is more marked if we place together the deaths from the disease in the four coldest and bleakest months of the year, namely, December, January, February, and March. For these months there were 183 deaths, for the

CHART 5.

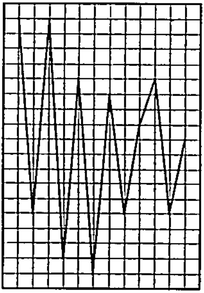


CHART 6.

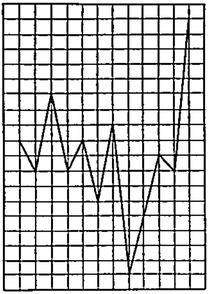
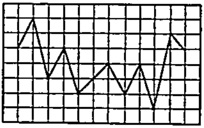


Chart 5. Relative frequency by months of deaths from diabetes during twenty-nine years in Chicago.

Chart 6. Relative frequency by months of deaths from diabetes during six years in Philadelphia.

CHART 7.



Relative frequency by months of deaths from diabetes during eleven years in Cincinnati.

four following months 155, and for the next four 167. It may be interesting, also, to compare with Chart 5 Charts 6 and 7, made from less complete statistics of mortality in Philadelphia[1] and Cincinnati.[2] The same seasonal variations are observable in these as in the chart of Chicago's mortality. Indeed, the increased mortality in the winter months is still more noticeable. The marked difference between the frequency of deaths and the exacerbations of a chronic disease like diabetes illustrates well the fact that there need be no close relationship between the two, for in diabetes, as in many other chronic ailments, death many times results from intercurrent diseases rather than from the primary one. These figures and charts correspond in a general way to the conclusions drawn by Purdy from his most thorough and interesting study of the United States census statistics of diabetes. He concludes: "The territory which furnishes the lowest mean temperature and highest altitudes also furnishes the highest mortality from diabetes."[3] If the mortality is greatest in cold regions, we might expect that it would be greatest in any given region during the coldest months, and if altitude influences mortality the barometric pressure in a given locality might. But barometric pressure in one locality varies so triflingly as undoubtedly to be of no importance. This fact is more clearly shown by comparing the mean temperature of seasons during the twenty-nine years covered by Chicago's mortality table with the mortality from diabetes during those seasons.

	Mean temperature.	Deaths.	Mean barometric. pressure.
Winter	26° F.	132	29 30
Spring	45°	128	29.22
Summer	69°	116	29.22
Autumn	50°	129	29.28

Although the variations in barometric pressure are at most only eight-hundredths of an inch, the highest pressure seems to correspond to the greatest death-rate.

It is probable that the mortality of diabetes is greatly influenced by the pulmonary complications which are a common cause of death in this affection, and therefore the mortality statistics do not correspond with the statistics of the recurrence of the disease or its variations in severity.

The following chart (8) and figures show the relative mortality of diabetes per 100,000 inhabitants in Chicago by years. It is especially interesting because of the demonstrable sudden and great increase in mortality that occurs after 1875.

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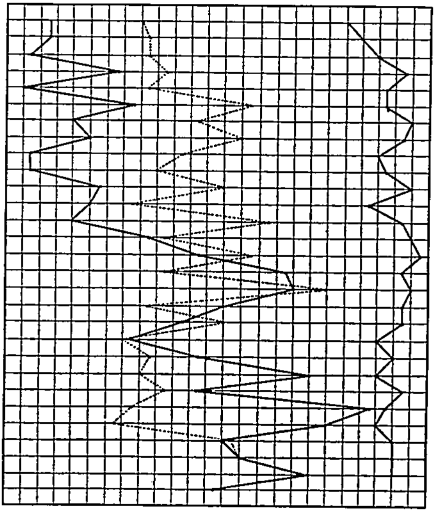
[1] From statistics of six years.

[2] From statistics of eleven years.

[3] Purdy: Diabetes. Students' and Physicians' Ready Reference Series.

CHART 8.



Relation of annual death-rate from diabetes (D) in Chicago to annual mean temperature (A) and mean midwinter temperature (W).

	Per 100,000 inhabitants.		Per 100,000 inhabitants.
In 1864 mortality was . . .	. 0.6	1879 mortality was . . .	. 3.5
1865 " " . . .	. 0.5	1880 " " . . .	. 3.6
1866 " " . . .	. 0.4	1881 " " . . .	. 2.8
1867 " " . . .	. 1.36	1882 " " . . .	. 2.3
1868 " " . . .	. 0.4	1883 " " . . .	. 1.7
1869 " " . . .	. 1.5	1884 " " . . .	. 2.5
1870 " " . . .	. 1.0	1885 " " . . .	. 4.2
1871 " " . . .	. 1.2	1886 " " . . .	. 2.5
1872 " " . . .	. 0.5	1887 " " . . .	. 4.5
1873 " " . . .	. 0.5	1888 " " . . .	. 4.0
1874 " " . . .	. 1.3	1889 " " . . .	. 2.8
1875 " " . . .	. 1.25	1890 " " . . .	. 3.0
1876 " " . . .	. 1.0	1891 " " . . .	. 3.8
1877 " " . . .	. 1.9	1892 " " . . .	. 2.9
1878 " " . . .	. 2.5		

From 1864 to 1875 the average mortality per 100,000 inhabitants is 0.92, and ranges from 0.5 to 1.5. From 1876 to 1892 the average is 2.8, and ranges from 1.7 to 4.5. The increases which this chart shows do not correspond to increases in population, for between 1886 and 1888 the mortality from diabetes is greatest, and the gain in population was about one-seventh. From 1884 to 1886 was the next highest mortality, and the gain in population was about one-eighth. From 1890 to 1892 was the next highest, and the gain in population was one-sixth. From 1871 to 1873 the mortality was very low, but the gain in population was about one-seventh. From 1885 to 1886 occurred the greatest fall in the mortality, and the increase in population was about one-fifteenth. From 1879 to 1883 there was a steady and considerable fall in mortality, and a gain in population of more than one-third, or by years from 1879 to 1880 about one-sixteenth, from 1880 to 1882 about one-seventh, and 1882 to 1883 about one-sixteenth. Nor does the mortality correspond to the mean annual temperatures or the mean temperature of the coldest month, as the two upper lines in Chart 8 show. The uppermost one shows the variation in mean annual temperature during the various years; the broken line the mean temperature for January in each year. It will be observed that in 1872 and 1873, when the mortality is low, that the mean annual temperature is moderate and the mean winter temperature rather low. In 1866 and 1868 the mortality is also low, but in 1865 the mean annual temperature and the mean winter temperature are both low, but in 1868 the mean annual temperature is moderate, though the mean winter temperature is low. In 1883 the rate of mortality from diabetes is low, the mean annual temperature and the mean winter temperature are low; in 1886 the mortality is also low, the mean annual temperature is moderately high, and the mean winter temperature moderate. In 1889 the mortality is also low, but the mean annual temperature and the mean winter temperature are moderately high. In 1867 the mortality is relatively high for the first eleven years represented in this chart; the mean annual temperature is moderately high, and the mean winter temperature low. In 1869 the mortality is relatively high, the mean annual temperature moderate, the mean winter temperature high. In 1879 the mortality is great, the mean annual temperature moderately high, the mean winter temperature moderately low. In 1885 the mortality is high, the mean winter temperature is low, and the mean annual temperature moderately low. The same is true of 1887. Nor does the mortality rate vary synchronously with the mean annual barometric pressure. It is evident, therefore, that there is no relationship between mortality variations and variations in mean annual or winter temperature or barometric changes. The great increase in mortality from diabetes in Chicago after 1876 cannot be accounted for by either unusually rapid increase in population or variations of mean temperature. It would be interesting if statistics were accessible to compare the annual mortality with changes in density of population—that is, number of inhabitants per square mile.

The mean mortality in Chicago from 1864 to 1892 is 2.02 per 100,000 inhabitants. According to Davidson[1] and Hirsch,[2] in Australia it is about 2, in Scotland 1, in England about 5, in Ireland about 2. In other localities these authors base their statements of mortality upon the total number of deaths rather than upon the number of inhabitants. In Norway it is said to be 2.5 per 1000 of total mortality. In Germany 1. By the United States census for 1870, 1.7; for 1880, 1.9. In England 1.25, in Ireland 0.74, in Schleswig-Holstein, 0.65, Berlin 0.94, Chemnitz 1, Frankfort-on-Main 1.6, Wurzburg 1.2, Brussels 0.6. Purdy has shown that in different States in this country the mortality from diabetes per 1000 of total mortality varies from 0.55 in Alabama to 6.36 in Vermont.[3] In Illinois it is 2.11, in Iowa 2.42, in Indiana 2.72, Wisconsin 2.81, Michigan 2.68, Minnesota 1.99.

From a further study of the case records from which these statistics have been drawn several other interesting conclusions can be adduced, but they are not novel. For example, in mild cases variations in the amount of sugar in the urine in the same month are great, or it may be present or disappear and reappear several times in one month, though the patient maintains the same diet and treatment continuously. It is noticeable also that there is no relationship between the specific gravity of the urine and the percentage of sugar in it. For instance, taking figures from one case, with specific gravities of 1025 and 1028, there was a trace of sugar; with a specific gravity of 1029, none; with a specific gravity of 1030, 2 per cent.; with a specific gravity of 1035, 1 per cent.; a specific gravity of 1038, $1\frac{8}{10}$ per cent.; with a specific gravity of 1040, 1.8 per cent.; with a specific gravity of 1041, 1.5 per cent.; a specific gravity of 1043, 1.8 per cent.; a specific gravity of 1045, 1.5 per cent. In other cases a specific gravity of 1043 was accompanied by 2 per cent. of sugar; a specific gravity of 1048 by 1.5 per cent.; a specific gravity of 1038 by 2 per cent.; again, 1038 by 1 per cent., and 1030 by 2 per cent.; 1040 by 3 per cent., and 1028 by 3 per cent. The feelings of weakness and malaise, so characteristic of the diabetic state are correlated with the total amount of sugar eliminated, but very different quantities will produce similar effects in different individuals. For example, in one patient trifling weakness is noticed when 7.5 grammes are voided daily, and increases when 3.75 are voided, and is very marked when from 20 to 75 are voided daily. In another case moderate general discomfort of the characteristic kind is felt while from 7 to 10 grammes are voided, but becomes intense when from 40 to 120 are passed. In a third case equally intense symptoms accompany the passage of only 1.3 grammes daily, and are moderately severe when only 0.4 to 0.5 gramme is voided. These variations are readily understood if the fact is appreciated that an excess of sugar in the blood and urine is only one factor in the diabetic state, and that others little understood, which result from the malnutrition of the disease, are as important or perhaps more important causative factors of the general symptoms characteristic of the disease.

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[1] Davidson: Geographical Pathology.

[2] Hirsch: Handbook of Geographical and Historical Pathology.

[3] Purdy: Diabetes. Physicians' and Students' Ready Reference Series.

65 RANDOLPH STREET.

OBSERVATIONS ON THE DIAGNOSIS OF DIPHTHERIA.

A STUDY OF ITS LOCAL TREATMENT AND A FEW CASES TREATED WITH ANTITOXIN.

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OF BOSTON, MASS.

I SHALL assume that diphtheria is caused by the Klebs-Loeffler bacillus, and begins as a local disease. The diphtheria bacillus flourishes chiefly in the throat and is not a motile bacillus, but must be carried to the healthy individual. This is done principally by direct transferrence from mouth to mouth, or hand to mouth or nose. By mouth to mouth I mean, for example, a healthy child may catch diphtheria by biting from the same apple, putting the same toys in the mouth, using the same handkerchief as a child in whose throat diphtheria bacilli are present, or by kissing such a child; or a mother may use her own handkerchief for a neighbor's ailing child, and thus unwittingly carry the disease to her own children. The closer contact among children, and the habit they have of putting things in their mouths, show why the disease is more prevalent among them than among adults. The bacilli may get on to the hands of those who are taking care of or are about persons ill with diphtheria, and unless the hands are carefully washed may be transferred to the mouth at the next meal, on a piece of bread, for instance. Again, the bacilli may live for months in the garments of a person who has been ill with diphtheria. But I need not multiply examples as to the mode of contagion.

The bacilli, once conveyed to the mouth or nose, may remain some days, or more than a week even, without showing any sign of their presence, and in some cases may produce no symptoms of disease, although during this period such individuals may give diphtheria to others; but in the usual course of things the presence of bacilli in the throat is followed probably within a day or two by congestion, although this congestion may not be marked; and usually the tonsils, palate, or pharynx are first attacked; this congestion is sometimes accompanied by much œdema and swelling and is generally soon followed by the